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FIGS. 1A and 1B depict a top-level functional block diagram of one embodiment of a media content distribution system;

FIGS. 2A-2F, which illustrate the relationship of DFT coefficients of an original signal, down-sampled signal, and the down-sampled signal after being up-sampled;

5 FIG. 3 is a flow chart that illustrates the logic of the watermarking embedding algorithm according to a preferred embodiment of the present invention;

FIG. 4 is a flow chart of the watermark detection algorithm according to a preferred embodiment of the present invention;

FIG. 5 show the original unwatermarked Lena image;

10 FIG. 6 shows the watermarked Lena image;

FIG. 7A shows the difference between the original image and the watermarked image;

FIG. 7B shows the difference of the DFT magnitude between the original image and the watermarked image;

15 FIG. 8 shows the results of the computing the PSNR (Peak Signal to Noise Ratio) of the watermarked image as a function of embedding strength  $\lambda$  and the embedding bands  $\{B_i\}$ ;

FIG. 9 shows the rescaled Lena image of the image down-scaled by a factor 0.4375;

20 FIG. 10 shows the results of the correlation detection for scaling factors of 0.75, 0.5, 0.4375 and 0.3125;

FIG. 11 shows the image rotated counter-clockwise by  $30^\circ$ ;

FIG. 12 shows the results of correlation detection for a set of images rotated by angles  $-3^\circ$ ,  $5^\circ$ ,  $30^\circ$  and  $45^\circ$ ;

25 FIG. 13 shows the correlation detection responses of cropped images with cropping ratios (in both dimensions) of 0.125, 0.5, 0.7812 and 0.9453;

FIG. 14 shows the compressed Lena image with quality 7%;

30 FIG. 15 show the correlation detector responses of JPEG compressed images with compression quality parameters of 95%, 50%, 20% and 7%;

FIG. 16 shows a correlation detection response to an attacked image;

FIG. 17 shows a somewhat noisy correlation response;